Abstract S3 Figure 1

Conclusions New antifibrotic treatments for IPF throw into sharp focus the question of whether or not a proportion of IPF is due to occult asbestos exposure; patients known to have asbestos exposure are currently not considered to be candidates for antifibrotic treatments. Our data are consistent with a proportion of IPF being attributable to asbestos exposure but are not conclusive and further research is needed.

S4 RELATIONSHIP BETWEEN HISTORIC UK ASBESTOS IMPORTS AND ANNUAL MORTALITY DUE TO MESOTHELIOMA, ASBESTOSIS AND IDIOPATHIC PULMONARY FIBROSIS

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Background Previous studies from a number of countries have demonstrated that the rising mortality due to mesothelioma and asbestosis can be predicted from their historic asbestos usage. Mortality due to idiopathic pulmonary fibrosis (IPF) is also rising in the UK, without any identified explanation. This analysis compared annual male and female mortality due to IPF, asbestosis and mesothelioma, and examined the relationship between mortality and national asbestos import data.

Methods Mortality data for IPF and asbestosis in England and Wales were available from the Office for National Statistics (ONS). Data for mesothelioma deaths in England and Wales and historic UK asbestos import data were available from the Health and Safety Executive (HSE). The numbers of annual deaths due to each condition were plotted separately by gender, against UK asbestos imports 48 years earlier. Pearson correlation co-efficients were then calculated.

Results Correlation co-efficients for each condition are shown in Table 1. The annual number of deaths due to mesothelioma and IPF were significantly correlated with historical asbestos imports

Abstract S4 Table 1 Correlation co-efficients for historic national asbestos import data, plotted against annual mortality due to mesothelioma, asbestosis, and idiopathic pulmonary fibrosis (IPF)

	Mesothelioma	Asbestosis	IPF
Male	0.96 ($p < 0.001$)	0.87 ($p < 0.001$)	0.96 ($p < 0.001$)
Female	0.94 ($p < 0.001$)	-0.15 ($p = 0.32$)	0.97 ($p < 0.001$)

for both genders. For asbestosis mortality, a similar relationship was found for male but not female deaths.

Conclusion The strength of the association between IPF and historical asbestos imports was similar to that seen for mesothelioma mortality. This finding suggests that the role of occupational and environmental asbestos exposure in the aetiology of IPF requires further consideration.

S5 PREVALENCE OF IGE SENSITISATION TO 'IMPROVER MIX' ENZYMES AMONG SYMPTOMATIC BAKERS WORKING IN UK SCRATCH BAKERIES

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Introduction and objectives Bakers working in supermarket scratch bakeries in the UK are exposed not only to flour and fungal alpha amylase but also other enzymes, incorporated in a pre-mixed bag of 'dough improvers'. Bakers and their employers are usually unaware of which enzymes are being used within the 'improver mix'. We have examined the question of whether supermarket bakers develop sensitisation to 'improver mix' enzymes other than fungal alpha amylase.

Abstract S5 Table 1 Sensitisation to 'improver mix' enzyme in bakers stratified by sensitisation to either flour and/or alpha amylase

	Quantity of enzyme used in 'improver mix' (ppm)	Sensitisation to 'improver mix' enzyme		
		All bakers*	Bakers co-sensitised to flour and/or alpha amylase*	Bakers not-sensitised to flour and/or alpha amylase*
'Improver enzyme' used in bakery				
Maltogenic amylase	40–50	12/260 (5%)	10/84 (12%)	2/176 (1%)
Cellulase	25	11/119 (9%)	8/26 (31%)	3/93 (3%)
Fungal Xylanase				
		40/260 (15%)	36/84 (43%)	4/176 (2%)
	20			
	4	32/141 (23%)	31/58 (53%)	1/83 (1%)
Fungal Xylanase	X 5 conc	(23%)	(53%)	(1%)
		25/260 (10%)	24/84 (29%)	1/176 (0.6%)
Lipase	20	(10%)	(29%)	(0.6%)
		35/260 (13%)	35/84 (42%)	0/176 (0%)
Bacterial Xylanase	10	(13%)	(42%)	(0%)
		32/260 (12%)	30/84 (36%)	2/176 (1%)
Fungal α -amylase	10	(12%)	(36%)	(1%)
		29/260 (11%)	27/84 (32%)	2/176 (1%)
Glucose Oxidase	5–10	(11%)	(32%)	(1%)
Bacterial α -amylase	0.5	15/260 (6%)	4/26 (17%)	1/93 (0.6%)

Spoken sessions

Methods We assayed specific IgE sensitisation in 300 bakers employed by one of two large UK supermarkets who, at routine health surveillance, had declared work related upper or lower respiratory symptoms. Sensitisation was determined using radio-allergosorbent assay to enzymes contained within the specific 'improver' mix used by the employing supermarket; each mix contained eight individual enzymes which were not necessarily common to both supermarkets.

Results Bakers were sensitised to each of the individual 'improver' enzymes with a prevalence ranging from 1.8% to 23.9%; the frequency did not appear to be associated with the quantity of enzyme incorporated in the mix. Sensitisation was far more likely if a baker was sensitised also to either flour or fungal alpha amylase; but a small proportion (5%) of bakers who were sensitised to neither flour nor fungal alpha amylase had specific IgE to one or more of the 'improver mix' enzymes.

Conclusions Bakers working in UK supermarket bakeries can become sensitised to improver enzymes other than fungal alpha amylase. The clinical significance of this remains unclear but the message is important both in the diagnosis of bakers with work-related respiratory symptoms and in any programme of immunological surveillance.

S6 THE ROLE OF INDIVIDUALLY VENTILATED CAGES IN PREVENTION OF LABORATORY ANIMAL ALLERGY: A PROOF OF CONCEPT STUDY

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Introduction and objectives At least 12000 people work with laboratory animals in the UK. Approximately 15% of exposed employees develop specific IgE sensitisation and 10% clinical symptoms of laboratory animal allergy (LAA), a form of occupational asthma. Individually ventilated cages (IVCs) are increasingly replacing conventional open cages (primarily to protect mice from external infection) and whilst this can be associated with lower levels of ambient aeroallergen levels no corresponding reduction in the incidence of LAA is apparent. The SPIRAL

(Safe Practice In Reducing Allergy in Laboratories) study is a large multi-centred study designed to increase understanding of the complex association between workplace exposure to mouse allergens and development of sensitisation, and to evaluate the risk of working with mice today.

Methods A cross-sectional study of animal workers at seven UK medical research institutions is in progress. We aim to recruit 250 people working in IVC-only facilities and 160 people working in mixed facilities; our primary outcome is a comparison of prevalence of sensitisation to Mus m 1 (mouse urinary antigen) between these two groups. Participants are invited to complete a detailed online questionnaire about work tasks and practices. Skin-prick tests to common aeroallergens and various animal proteins are performed and blood samples analysed for serum specific IgE to Mus m 1. Aeroallergen sampling for particular matter and Mus m 1 is undertaken concurrently to provide additional information about potential exposures. Recently employed individuals are invited to participate in a cohort study to determine incidence rates of laboratory animal allergy.

Results 136 individuals have been recruited to date; Table 1 shows their demographics and preliminary immunology results. Prevalence of allergic symptoms and sensitisation is similar to that anticipated.

Conclusion The SPIRAL study is the largest, most detailed study of LAA to be carried out. It aims to increase understanding of the relationship between allergen exposure and risk of sensitisation with the goal of significantly reducing the incidence of LAA. The results will be used to develop a "Code of best working practices" for facilities using IVC systems, nationally and further afield.

New approaches to the management of ILD

S7 NITROFURANTOIN LUNG TOXICITY – ARE STEROIDS USEFUL?

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Background Recurrent urinary tract infections are common and current UK guidelines advocate prophylaxis with nitrofurantoin in selected patients¹. Nitrofurantoin-induced pulmonary toxicity ("Nitrofurantoin lung" or NL) is uncommon but can result in progressive respiratory failure. Locally we have observed a rise in NL. Pulmonary toxicity necessitates cessation of nitrofurantoin, however the utility of additional corticosteroid therapy remains controversial². We examined a detailed case series to ascertain the effect of drug cessation alone and addition of oral corticosteroids in NL.

Methods Using a local Interstitial Lung Disease database, we retrospectively identified patients who had presented with NL between 2009–2013. Patient demographics, imaging, pulmonary function and prescribing data were accessed. Local and national nitrofurantoin prescribing rates were also reviewed.

Results Scottish prescribing data demonstrated increased community nitrofurantoin prescriptions from 3.4 to 11 items/1000 patients from 2008–2012. Our database identified 13 NL cases (93% female, mean age 74 years, range 63–83). All had a history of chronic cystitis and presented with chronic NL. Cumulative

Abstract S6 Table 1 Baseline characteristics SPIRAL study participants to date and preliminary results

	Number (%)*
Sex	
Men	53 (39%)
Women	83 (61%)
Job title	
Scientists	81 (60%)
Animal Technicians	40 (29%)
Other	15 (10%)
Type of facility	
IVC only	29 (21%)
Open cages	44 (32%)
Mixed facilities (IVC and open cages)	57 (42%)
Participant unsure	6 (4%)
Reported work related symptoms	
Allergic rhinitis	21 (16%)
Allergic conjunctivitis	16 (12%)
Asthma	11 (8%)
Sensitisation to mouse epithelium on skin-prick testing	
Positive	15 (11%)
Negative	121 (89%)

*percentages may not equal 100 due to rounding